CLAIM AMENDMENTS:

1. (currently amended) A coherence microscope including:

- a light source (1) emitting time-incoherent light,

- a divider (3) for dividing the light emitted by the light source (1) into measurement light which is supplied to a specimen (13) and reflected thereby, and reference light;

a point light source emitting the measurement light onto the specimen (13) and at least one confocal aperture member;

a microscope optical system (28) for focusing the measurement light on the specimen (13) and for focusing the measurement light reflected by the specimen on the at least one confocal aperture member, wherein the aperture of the at least one confocal aperture member is so selected that the depth extent of the confocal zone substantially corresponds to the depth stroke of the coherence microscope;

- a superimposition device (25, 31) for spatially superimposing the measurement light reflected by the specimen (13) with the reference light; and

- a sensor line (41) including a predetermined number of sensor elements for detecting the light resulting from the superimposition, the predetermined number of sensor elements being selected so a read-out rate of at least 60kHz is achieved;

wherein

- the superimposition device has an emission device (25, 31) for emitting the measurement light and the reference light which is adapted and arranged relative to the sensor line (41) such that extensive irradiation at least of a part of the sensor line (41) with superimposed light is effected and the ratio of the distances covered by the measurement light and the reference light from the emission device (25, 31) to the respective

impingement point on the sensor line (41) varies in the portion of the sensor line (41), that is irradiated with superimposed light~~,~~

~~characterised in that~~

~~the sensor line (41) is so designed that it permits a read-out rate of at least 60 kHz~~.

2. (currently amended) A coherence microscope as set forth in claim 1 characterised in that the sensor line (41) includes not more than about 1000 sensor elements ~~or sensor elements which are used~~.

3. (currently amended) A coherence microscope as set forth in claim 1 [[2]] characterised in that the sensor line (41) includes not more than about 500 sensor elements ~~or sensor elements which are used~~.

4. (previously presented) A coherence microscope as set forth in claim 1 characterised in that it has a depth variation which corresponds at least to the depth resolution of the coherence microscope and at most $N\lambda/4$, wherein λ is the wavelength of the light emitted by the light source (1) and N is the number of sensor elements in the sensor line (41).

5. (original) A coherence microscope as set forth in claim 4 characterised in that its depth variation is 100 μm or less.

6. (original) A coherence microscope as set forth in claim 5 characterised in that its depth variation is 20 μm or less.

7. (previously presented) A coherence microscope as set forth in claim 4 characterised in that its depth variation substantially corresponds to its depth resolution.

Claims 8 and 9 (canceled).

10. (currently amended) A coherence microscope as set forth in claim 1 [[8]] characterised in that there is an optical fiber (8) which feeds the measurement light to the microscope optical system (28).

11. (original) A coherence microscope as set forth in claim 10 characterised in that the optical fiber (8) is a monomode fiber.

12. (previously presented) A coherence microscope as set forth in claim 10 characterised in that the at least one confocal aperture member is formed by the optical fiber (8).

13. (previously presented) A coherence microscope as set forth in claim 10 characterised in that an ordered fiber bundle (100) is interposed between the optical fiber (8) and the microscope optical system.

14. (original) A coherence microscope as set forth in claim 13 characterised in that the at least one confocal aperture member is formed by the optical fiber (8) or by the fibers (104) of the fiber bundle (100).

15. (previously presented) A coherence microscope as set forth in claim 13 characterised in that the ordered fiber bundle (100) is integrated into an endoscope.

16. (original) A coherence microscope as set forth in claim 15 characterised in that the microscope optical system (28) is arranged at the distal end of the endoscope.

17. (previously presented) A coherence microscope as set forth in claim 13 characterised in that the numerical aperture and the magnification of the microscope optical system (28) are so selected that the optical resolution at the fiber bundle end face corresponds to the diameter of the fibers (104) of the ordered fiber bundle (100).

18. (previously presented) A coherence microscope as set forth in claim 17 characterised in that there is provided a scanning device (32; 108) for coupling measurement light into the fibers (104) of the ordered fiber bundle (100) and/or for coupling measurement light reflected by the specimen (13) out of the fibers (104).

19. (original) A coherence microscope as set forth in claim 18 characterised in that provided between the scanning device (32, 108) and the proximal end (106) of the ordered fiber bundle (100) is an optical system (26) which is so designed that it slightly defocuses the light which is to be coupled into the fibers (104) at the proximal end (106) of the fiber bundle (100).

20. (original) A coherence microscope as set forth in claim 18 characterised in that there is provided a scanning control means which is adapted to perform an initialisation step in which the central position of the fibers (104) at the proximal end (106) of the ordered fiber bundle is ascertained.

21. (previously presented) A coherence microscope as set forth in claim 18 characterised in that the fibers (104) of the ordered fiber bundle (100) are arranged in linearly mutually juxtaposed relationship at the proximal end (106) thereof.

22. (original) A coherence microscope as set forth in claim 21 characterised in that the scanning device (32) includes a rotatable polygonal mirror (108).

23. (previously presented) A coherence microscope as set forth in claim 13 characterised in that the numerical aperture and the magnification of the microscope optical system (28) are so selected that the lateral resolution approximately corresponds to the diameter of the fibers (104) of the ordered fiber bundle (100) and a maximum depth variation is achieved.

24. (currently amended) In a coherence microscope including a light source (1) emitting time-incoherent light, a divider (3) for dividing the light emitted by the light source (1) into measurement light which is supplied to a specimen (13) and reflected thereby, and reference light; a point light source emitting the measurement light onto the specimen (13) and at least one confocal aperture member; a microscope optical system (28) for focusing the measurement light on the specimen (13) and for focusing the measurement light reflected by the specimen on the at least one confocal aperture member, wherein the aperture of the at least one confocal aperture member is so selected that the depth extent of the confocal zone substantially corresponds to the depth variation of the coherence microscope; a superimposition device (25, 31) for spatially superimposing the measurement light reflected by the specimen (13) with the reference light; and a sensor line (41) including a predetermined number of sensor elements for detecting the light resulting from the superimposition, the predetermined number of sensor elements being selected so a read-out rate of at least 60kHz is achieved, wherein the superimposition device has an emission device (25, 31) for emitting the measurement light and the reference light which is adapted and arranged relative to the sensor line (41) such that extensive irradiation at least of a part of the sensor line (41) with superimposed light is effected and the ratio of the distances covered by the measurement light and the reference light from the emission device (25, 31) to the respective impingement point on the sensor line (41) varies in the portion of the sensor line (41), that is irradiated with superimposed light, a [[A]] method of operating a coherence microscope ~~as set forth in claim 1~~ characterised in that scanning of the specimen is effected along a one-dimensional line within a lateral scanning plane whose orientation is adjustable.

25. (original) A method as set forth in claim 24 characterised in that the width of the one-dimensional line is adapted to the desired resolution and/or the desired signal strength.

26. (new) A coherence microscope as set forth in claim 1 characterised in that the sensor line (41) includes at least 1000 sensor elements and wherein not more than about 1000 sensor elements are used.

27. (new) A coherence microscope as set forth in claim 1 characterised in that the sensor line (41) includes at least 500 sensor elements and wherein not more than about 500 sensor elements are used.

28. (new) A coherence microscope comprising:

- a light source (1) emitting time-incoherent light,

- a divider (3) for dividing the light emitted by the light source (1) into measurement light which is supplied to a specimen (13) and reflected thereby, and reference light;

- a superimposition device (25, 31) for spatially superimposing the measurement light reflected by the specimen (13) with the reference light;

- a short sensor line (41) or a long sensor line only a portion of the sensor elements of which are used for detecting the light resulting from the superimposition, the sensor line being so short or only such a portion of sensor elements is used that a read-out rate of at least 60 kHz is achieved;

- an emission device (25, 31) for emitting the measurement light and the reference light from the superimposition device, the emission device being adapted and arranged relative to the sensor line (41) such that extensive irradiation at least of a part of the sensor line (41) with superimposed light is effected and the ratio of the distances

covered by the measurement light and the reference light from the emission device (25, 31) to the respective impingement point on the sensor line (41) varies in the portion of the sensor line (41), that is irradiated with superimposed light;

- a point light source emitting the measurement light onto the specimen (13) and at least one confocal aperture member;

- a microscope optical system (28) for focusing the measurement light onto the specimen (13) and for focusing the measurement light reflected by the specimen on the at least one confocal aperture member;

- an optical fiber (8) which feeds the measurement light to the microscope optical system (28) and an ordered fiber bundle (100) which is interposed between the optical fiber (8) and the microscope optical system (28), the fibers (104) of the ordered fiber bundle (100) being arranged in linearly mutually juxtaposed relationship at the proximal end (106) thereof; and

- a scanning device including a rotatable polygonal mirror (108) for coupling measurement light into the fibers (104) of the ordered fiber bundle (100) and/or for coupling measurement light reflected by the specimen (13) out of the fibers (104).